Peerocracy

Multistage weighted voting mechanism for a peer review meritocratic trust network.
(non ranking -- automated cumulative voting -- meritocratic approval voting mechanism for content validation)

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This text is a work in progress but the core of the voting system is pretty much done.

Abstract

In this paper I propose a new type of voting system. It applies a weighting mechanism to select the value of the votes in specific domains and chooses the winner based on approval voting, calculating the sum of weights of each individual candidate. In order to accurately measure the weights of the votes (and to implement equality of opportunity) all voters are also candidates.

Introduction

All human interaction and social relations (self interest, selection, cooperation, reciprocity, value transactions) revolve around the reputation of the involved parts and thus on measurements of trust (value assessment, confidence). Trust is one of the most important factors that enable the long term, peaceful, cooperation between people, it is the fundamental natural resource (the economic utility of trust)

We've seen the power of rating systems to assess value and to add trust. From ebay to uber, from facebook's likes to reddit's up and down votes, rating systems promote good content and weed out the bad one.
But not all voting systems are equally valid. Plurality voting for example (also known as first-past-the-post or one-person-one-vote, one of the most widely used system) is considered among academics the worst method there is. One vote per person doesn't offer the full picture, in fact it offers very little information about the preferences of the electorate.

No one person can grasp the full complexity of human life.Some people are better informed about a particular subject, some people are more skilled for a certain task. Even a well informed person is usually well informed in particular domains.

That's why you don't vote on the whole subject, you vote on the domains associated with that subject. The more you know about a subject the more your vote should count in the end result. The more you get voted the more reputation you receive on the domains that people voted and thus the heavier your votes weight. It is a voting system in which the number of participants and the number of candidates are always the same.

The problem

Since the beginning of life, organisms organized themselves in hierarchies based on different characteristics that were relevant for their survival in the environment in which they reside. There are many examples of types of organizations between members of the same species but the most advanced are usually based on cooperation inside a hierarchy.

Humans are social creatures by nature, they create societies in which they collaborate but they also form hierarchies based on their specialisation and expertise. Every member wants to have his voice heard, taken into consideration in the decisions that affects them.

> *“Now, society between human beings, except in the relation of master and slave, is manifestly impossible on any other footing than that the interests of all are to be consulted. Society between equals can only exist on the understanding that the interests of all are to be regarded equally. And since in all states of civilization, every person, except an absolute monarch, has equals, every one is obligated to live on these terms with somebody; and in every age some advance is made towards a state in which it would be impossible to live permanently on other terms with anybody.”*
> *-- Trust - Francis Fukuyama*

This was easier to obtain in small communities in which everybody knew everybody else (small tribes and familial societies) because they trusted each other's knowledge and knew what to expect from one another, but as societies increased in size (cities, countries, federations) the problem of trust became more and more prominent. For that purpose we've created tools that strengthen the social nature, to help us collaborate. From language to art, from money to conventions, standards and laws, we try to find new ways to communicate that trust.

Trust is what makes economic exchange possible, it creates the conditions that facilitate economic exchange.

> *“Individual man is born into a socially organized environment. In this sense alone we may accept the saying that society is-logically or historical-antecedent to the individual. In every other sense this dictum is either empty or nonsensical. The individual lives and*

> *acts within society. But society is nothing but the combination of individuals for cooperative effort. It exists nowhere else than in the actions of individual men. It is a delusion to search for it outside the actions of individuals. To speak of a society's autonomous and independent existence, of its life, its soul, and its actions is a metaphor which can easily lead to crass errors.*
> *[..]*
> *Society is not merely interaction. There is interaction-reciprocal influence-between all parts of the universe: between the wolf and the sheep he devours; between the germ and the man it kills; between the falling stone and the thing upon which it falls. Society, on the other hand, always involves men acting in cooperation with other men in order to let all participants attain their own ends.*
> *[..]*
> *The course of history is determined by the actions of individuals and by the effects of these actions. The actions are determined by the value judgments of the acting individuals, i.e., the ends which they were eager to attain, and by the means which they applied for the attainment of these ends. The choice of the means is an outcome of the whole body of technological knowledge of the acting individuals.*
> *--- Ludwig von Mises - Human Action*

Around the world, most of the accepted decision-making methods are composed of different national institutions gathered in centralised structures that try to work for the good of the majority that they represent. But the world is uncertain and complex, planning by governments is unable to cover all the human interactions, poor institution performance, inflexible and slow moving compared to the of complexity of modern societies and corruption create distrust in the institutions that play the most important roles in the transmission and evaluation of information and the implementation of decisions.

> *Men are not infallible; they err very often. It is not true that the masses are always right and know the means for attaining the ends aimed at. "Belief in the common man" is no better founded than was belief in the supernatural gifts of kings, priests, and noblemen. Democracy guarantees a system of government in accordance with the wishes and plans of the majority. But it cannot prevent majorities from falling victim to erroneous ideas and from adopting inappropriate policies which not only fail to realize the ends aimed at but result in disaster. Majorities too may err and destroy our civilization. The good cause will not triumph merely on account of its reasonableness and expediency. Only if men are such that they will finally espouse policies reasonable and likely to attain the ultimate ends aimed at, will civilization improve and society and state render men more satisfied, although not happy in a metaphysical sense. [..] Man is free in the sense that he must daily choose anew between policies that lead to success and those that lead to disaster, social disintegration, and barbarism.”*
> *--- Ludwig von Mises - Human Action*

> *We are witnessing a decline of the trust in politics, institutions and governments.*
> *[Public trust in the government remains near historic lows. Only 18% of Americans today say they can trust the government in Washington to do what is right "just about always" (3%) or "most of the time" (15%).*
> *-- Public Trust in Government: 1958-2017 DECEMBER 14, 2017 - Pew Research Center - U.S. Politics & Policy]*

With the improved access to information, it became obvious that the tools and institutions that we are using have been been derailed by private interests or have fallen prey to petty corruption. The inequality has risen around the globe, especially in the more advanced countries, while the economic growth rates have fallen. Extremism is on the rise across the political spectrum while the environment is degrading at an alarming rate.

The decision makers are too far removed from the effects of their decisions, they become more interested in holding the decision power rather than following the purpose for which they were elected.

> *"During the forty-year period from 1970 to 2010, there was an enormous upsurge in the number of democracies around the world. In 1973, only 45 of the world's 151 countries were counted as "free" by Freedom House [..] The following generation saw momentous political change, with democracies and market-oriented economies spreading in virtually every part of the world except for the Arab Middle East. By the late 1990s, some 120 countries around the world—more than 60 percent of the world's independent states—had become electoral democracies. [..] Underlying these changes in political systems was a massive social transformation as well. The shift to democracy was a result of millions of formerly passive individuals around the world organizing themselves and participating in the political life of their societies. This social mobilization was driven by a host of factors: greatly expanded access to education that made people more aware of themselves and the political world around them; information technology, which facilitated the rapid spread of ideas and knowledge; cheap travel and communications that allowed people to vote with their feet if they didn't like their government; and greater prosperity, which induced people to demand better protection of their rights.*
> *The third wave crested after the late 1990s, however, and a "democratic recession" emerged in the first decade of the twenty-first century. Approximately one in five countries that had been part of the third wave either reverted to authoritarianism or saw a significant erosion of democratic institutions. Freedom House noted that 2009 marked the fourth consecutive year in which freedom had declined around the world, the first time this had happened since it established its measures of freedom in 1973.*
> *At the beginning of the second decade of the twenty-first century, malaise in the democratic world took several distinct forms. The first was the outright reversal of democratic gains that had*

> *occurred in countries such as Russia, Venezuela, and Iran, where elected leaders were busy dismantling democratic institutions by manipulating elections, closing down or buying independent TV and newspaper outlets, and clamping down on opposition activities. Liberal democracy is more than majority voting in elections; it is a complex set of institutions that restrain and regularize the exercise of power through law and a system of checks and balances. In many countries, official acceptance of democratic legitimacy was accompanied by the systematic removal of checks on executive power and the erosion of the rule of law.*
> *In other cases, countries that seemed to be making a transition from authoritarian government got stuck in what the analyst Thomas Carothers has labeled a "gray zone," where they were neither fully authoritarian nor meaningfully democratic.6 Many successor states to the former Soviet Union, like Kazakhstan and Uzbekistan in Central Asia, found themselves in this situation. There had been a broad assumption in the years following the fall of the Berlin Wall in 1989 that virtually all countries were transitioning to democracy and that failures of democratic practice would be overcome with the simple passage of time. Carothers pointed out that this "transition paradigm" was an unwarranted assumption and that many authoritarian elites had no interest in implementing democratic institutions that would dilute their power.*
> *A third category of concern has to do not with the failure of political systems to become or remain democratic but rather their failure to deliver the basic services that people demand from their governments. The mere fact that a country has democratic institutions tells us very little about whether it is well or badly governed. This failure to deliver on the promise of democracy poses what is perhaps the greatest challenge to the legitimacy of such political systems."*
> *-- Francis Fukuyama - The Origins of Political Order from Pre-human Times to the French Revolution*

We have to keep in mind that no one person can truly have the entirety of knowledge of another person. Why should someone decide for any other person and why should we assume that one person could decide for many others or even all the other people.

Even those who believe in the power of the market, are starting to realize that the economy is unable to self optimize fast enough to solve general problems because the individual incentives do not align with the collective goals.

This is a bottom up problem and it can not be fixed top down.
If you could easily measure the trust of said groups or individuals you could bypass many tools on which we rely in our day to day interaction in order to create a self sustainable society.

The Idea

Measuring trust would need a tool that has certain characteristics:

- It has to be compatible with as many human types of interaction as possible. This can not be obtained unless the domains where trust is measured are generated on the fly the persons that use it.
- It has to retain a level of simplicity that could be understood by anyone independent of language, social background or age.
- It has to allow transactions, creation, subtraction (removal), liquidation and the dissolving (elimination, destruction) of trust.
- It has to be totally decentralised in order not to become susceptible to manipulation and censorship.
- It has to be totally transparent.

Based on the success of the scientific method i concluded that the best technique of reaching consensus is by peer review. Only by evaluating the work by the people with similar competence to the producers of the work you can really measure the trust that it deserves, maintain the standards of quality and improve performance.

> *"The intellectual methods of science do not differ in kind from those applied by the common man in his daily mundane reasoning. The scientist uses the same tools which the layman uses; he merely uses them more skillfully and cautiously. Understanding is not a privilege of the historians. It is everybody's business. In observing the conditions of his environment everybody is a historian. Everybody uses understanding in dealing with the uncertainty of future events to which he must adjust his own actions. The distinctive reasoning of the speculator is an understanding of the relevance of the various factors determining future events. And-let us emphasize it even at this early point of our investigations-action necessarily always aims at future and therefore uncertain conditions and thus is always speculation. Acting man looks, as it were, with the eyes of a historian into the future."*
> *--- Ludwig von Mises - Human Action*

Peer-review is the most advanced method of evaluation of competence because it has been proven to work by history and we can see it's effects in the advances of technology and, as I later realized, it was the basis of human cooperation since the dawn of human civilization.

Intuitive description

The system is composed of 3 classes: users, posts(blocks) and #tags, the voting is done up and down.

Every post, vote, transaction, edit or other type of action, that is taken into account for the weighting of reputation is recorded in a DAG (Directed acyclic graph) and is publicly available.

As an user creates a post he attaches to it a particular set of hash-tags.

Any other user can comment (add another post as a reply/child to the original post), vote on a particular hash-tags of the original post or add new hash-tags. The votes are attached to the hash-tags of the post. As more users vote on the original post, the reputation received by the individual tags increases or decreases the reputation of the creator of the post. That person can now use the reputation gathered to vote on the same tags on different posts.

All users start with reputation 1 on a new hash-tag

The user's reputation on the voting #tag does not diminish when voting.

Users can follow each other, when a user makes a public transaction he sends notifications to all his followers. the notifications of the people a user follows are displayed in a timeline form.
Special filters can be applied to sending and receiving of notifications for further customisation.

Hashtags can also be followed by users in order to receive constant updates about subjects of interest. Here too filters can be applied on the receiving side based on the reputation attached to the specific hashtags.

A vote up (uvote) is 10% of that user's reputation for that #hashtag and a vote down (dvote) is 1% of that user's reputation for that hashtag.

Hash-tags can be nested (attached to other tags) in order to form trees in which generally worded tags can have different values. #colour under #painting and #color under #photography are two different tags with different reputation.

The transfer of reputation from a post's hashtag to the creator's hashtag follows a logarithmic curve. The more reputation for that hashtag that user has, compared to the total reputation existent in the system for that hashtag and the number of users in the system, the slower it grows.
** the more reputation you have on that # the less you receive.

[*** in case #value doesn’t decreases fast enough, because you only use 10% of what you gain each step: The reputation gained by one user from the votes of another user can not be used to increase the reputation of the second user in a sequential vote. The first user can only increase the reputation of the second user using the reputation gained from different users.]

Once the vote is cast the user can remove his vote by voting the opposite way

Special cases

While private posts (limited access) are allowed, voting on them does not modify the public reputation of the user that created it. Only public posts can influence a user's voting power.

Private reputation is allowed for registered groups. Registered groups can co-author public posts and divide the received reputation based on the group's private reputation dynamics.

Anonymous public posting is possible but the votes received by the post do not transfer to the user that created the post.

Anonymous voting is allowed but it does not reflect the voter's reputation for that hash-tag nor it increases the reputation of the creator of the post. Anonymous voting is allowed only once per user. [new user creation has proof of work attached to it]

Public groups of users can be formed with custom rules of admission, as in verifiable ID in order to create boards for discussion and consensus for political parties where you need to make sure that the votes cast are from individual people who reside in a specific territory

#total

The sum of user's current value across all the attached tags.

-#tag
negative tags can be voted into existence (limited growth %)

Money / Credits
more research has to be done for this special case before implementation. the idea of trust is not compatible with the power to buy votes thus the tokens created by this network are not be used to

increase the value of any other hashtag except for #money

In the first couple of versions of the implementation of symposium (the name that I choose for this voting system’s implementation) should have this hashtag locked, at least until a decent number of users have been using and testing the system. The voting system must not be associated with the idea of a digital currency, the fact that it has that option available is a happy accident not a core feature and should not be treated as a cryptocurrency.

#money
voting is is restricted to uvote with [selected amount] You can not vote a #money tag with the percent part of your #money value in order to increase the seller's #money value.

Buyer -
Voting #money towards a seller extracts 100% of the value used from the #total [and 10% out of every individual hash-tags that the buyer has -- this is still to be tested IRL transactions to see how it influences the dynamics of the market]
Multiple buyers resolve thrum a Vickrey–Clarke–Groves auction.

Seller -
Asking price starts from the #total reputation of the post as tagged by the user and changes with sequential votes from the other users on the attached tags.

Each transaction costs 1%
(to ensure a constant deflation of the currency supply on sequential transactions -- this helps to balance out the inflationary side of the system and incentivises the users to create value by adding to the system rather than just exchanging the already existing resources
It can be used as a method of taxation - transaction tax for social purposes - it can be directed to public groups for solving social issues)

Incentives

A user can add a hashtag to a post that he did not created himself and gain 10%[?or more] of the reputation that that hash-tag gains extracting from the reputation that the creator of the post gains from the added hash-tag. The transfer of reputation follows the aforementioned logarithmic curve.

Formal description

Unfortunately I do not have a statistics or math background and I can not provide at the moment a more formal description than the above one. I am searching for ways in which I could approach this problem but it might take a while

The Condorcet winner can be chosen at any point in time by taking a snapshot and comparing the distribution of the values of individual tags. If there is a tie the first next vote that changes the situation is decisive.

Advantages:
Because you do not vote on participants but you select them from a multitude of participants based on individual's rating, the more users are in the system and the more tags each user has, the less chances of a "Condorcet_paradox" to occur.

To check:
circular voting - graphs of the curve that the total reputation grows in a system in which everyone starts with the same reputation and they vote each other in one direction or at random. -- https://en.wikipedia.org/wiki/Condorcet_paradox

Limited Example

user A has rating of 1 in #painting and 1 in #photography and 1 in #music

he creates a post and attaches (10% based on his previous value) 0.1 in #painting, 0.1 in #photography and 0.1 in #music

user B has a rating of 10 in #painting and 5 in #photography and 1 in #music

he votes on #painting and #photography

the post's value increases with 1 in #painting and 0.5 in #photography, #music does not change at the end user A has rating of 2 in #painting 1.5 in #photography and 1 in #music

Implementation

The system has to be totally distributed, for it's adequate running it should not use any type of central authority for any of its facets.

This type of rating system should be applied to a social network. In its ideal form it should be a browser plug-in/extension which adds a comment system that allows the users to attach input and value judgment on any web-page, to be viewed by the other visitors that use the same plug-in, while also being shared via notifications as direct link in each user's feed and to his followers.

This would create a decision making tool for large groups of people, a trust mesh to be applied across the world wide web.
Because of the distributed characteristic of the voting system and its universality, in order to ensure it's security it should use a totally distributed protocol (IPFS) for communication to create a public accessible DAG.
The data should be stored on the individual devices of the users that take part in the transaction with backups on 3 to 5 trusted users that are connected to the original users plus on the devices of any user that follows the hashtag that was used in the transaction.
The data contains the values prior to the transaction, the values after the transaction and at least 3 history states of the transactions that allowed the users that take part in the transaction to use those particular values. This should create a publicly verifiable history of the transactions in the system with enough redundancy.

Implementation issues

The effectiveness of an identity system that is to be used is limited by the method that the users choose to authenticate into the network

It has to use a form of proof of work for the creation of new accounts in order to deter Sybil attacks. In a Sybil attack, the attacker subverts the reputation system of a peer-to-peer network by creating a large number of pseudonymous identities, using them to gain a disproportionately large influence. A reputation system's vulnerability to a Sybil attack depends on how cheaply identities can be generated, the degree to which the reputation system accepts inputs from entities that do not have a chain of trust linking them to a trusted entity, and whether the reputation system treats all entities identically.

Even so, from the way it operates, the system offers an incentive to keep the same id(s) that one user created and used in order to fully profit form the received votes while offering the possibility to vote anonymously without the need to create a new user.
Also the fact that the whole history of transactions is public makes identification of malicious users easy and they can be downvoted by other users.

Conclusions

I believe that this meritocratic voting system could become the backbone of many other tools.
It can solve the problem of fake and misleading news and allow users to tag data across the web in order to be easier to use it in AI applications and statistics thus helping with several Big Data problems (finding the signal in the noise, inaccurate data and lack of skilled workers)

It can also create a platform for collective action and consensus. Imagine for example a political party that takes decisions not based on a rigid ideology or the will of a few representatives detached from the people who elected them or those who are affected by the decisions, but on the constant input of all it's members, based on their expertise as judged by each other and in which the representatives are in constant contact with the represented and can be rewarded or punished constantly, not once every several years.

Background

For a very long time I've been thinking of a way in which the problems of social interaction of large groups could be solved.
Growing up at the end of the Communist era in my country and the years of transition to the market economy gave me the opportunity to form a critical view of the mechanics of both social organisation methods. The constant struggle of the authorities with the corruption that permeates all institutions galvanized my opinion that all the current systems are limited and fail to provide a decent option to solving the complex web of issues that a modern society is confronted with.

Even tho the subject was one that I always pondered around 10 years ago (shortly after the 2008 financial crisis) the idea started to take shape when I tried to find a way in which one could clean up the information from the noise in an Internet forum. Most forums (or any type of social community as a matter of fact) end up in disarray because it is very hard to keep track about who-knows-what and what is relevant to whom and who decides what should be done. Basic decision making and trust management.

I came up with a weighted voting system that used the reputation of its members to assess the value of the information posted. A decentralized meritocratic hierarchy, that rewards its users based on their merit rather than wealth, status or the will of a central authority.

The more I thought about the tool, the more use cases I saw. I ended up having to learn about Sociology, Anthropology, Philosophy, Economy and many other subjects because I saw that the tool that I have created, while easy to comprehend and simple in its basic form, was in fact incredibly efficient at the management of trust. During my exploration I saw great thinkers across all domains reaching the same conclusion: “All complex systems require cooperation to operate” and “At the core of all human interaction is a decision about trust” This motivated me to push forward even if most of the feedback I received tended to be negative at start. I saw that people understand how the system should work but that they are quick to pass a negative judgement even if they do not have arguments to sustain them. It became apparent that it wasn’t that they didn’t trusted the idea but that they were alienated by the current systems to a degree to which they considered that there is no way a new and better method could be created, a very nihilistic outlook.

This system is not infallible, as any tool it can be used for good as well as it can be used for bad, but it will create a way in which we can measure our expertise in a visible way. It allows people to trust each other without the need for a central authority that decides who is right or wrong.

> *People who trust each other and are good at working with one another can adapt easily to new conditions and create appropriate new organisational forms.*
> *-- Trust - Francis Fukuyama*

It can help us pool our resources to clean up the transfer of information across the web and to reach consensus. Our differences are not our weakness, they are our strength but if there is too much diversity there is no common language. Without a method to communicate trust fear takes control and it transforms into violence.

It is each and everyone's responsibility to create a better path, we are all together in this.